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A STREAM GAUGING AND RAINFALL RECORDER FOR UNATTENDED LONG PERIOD OPERATION

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A STREAM GAUGING AND RAINFALL RECORDER FOR UNATTENDED LONG PERIOD OPERATION.

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1. A versatile recorder for long period operation in exposed or remote locations has been developed by the Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.), Australia. The object has been to provide a rugged instrument which is cheap and easy to install and capable of operating unattended for periods up to 12 months on its own power supply.

2. The recorder is housed in a weatherproof case, mounted on a tubular steel post through which pressure pipe and wiring pass to remote sensing elements. The mechanism has been designed so that any mechanical sensing device can be coupled to the recording pens to give records of any two variables such as waterlevel, rainfall, temperature, humidity, evaporation, windspeed etc.

3. The recorder is powered by small dry batteries which operate it for at least 12 months. The recording chart is also of sufficient length to provide a 12 months record. It is marked by pressing a pointed stylus on to the special plastic coated paper; this leaves a black dot so that the record appears as a line of small closely spaced dots. This is an improvement over ink pens which tend to record a trace of varying thickness with humidity change. Also the plastic coated paper does not expand in damp conditions, so ensuring more accurate records. Transcription to punched tape for automatic digital computation has been successfully engineered.

4. The recorder mechanism is controlled by a battery-wound spring clock. Since this unit cannot be expected to keep exact time over long periods, a time check device has been included, consisting of a lens which is arranged to mark the chart by burning a small hole in it at each clear passage of the noon sun.

5. For stream gauging the installation includes a small copper pressure tube, the end of which is covered by a synthetic rubber membrane suitably protected, and mounted directly in the river at minimum waterlevel by securing it to a rock or post. The tube is connected to a pressure sensing element mounted in the recorder, which may be up to 300 feet distant. The pressure element moves with pressure change due to water level variations over the immersed

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Sumner, C.J., Single pen, strip chart recorder for unattended long period operation, J. Sci. Inst., 36, 475-477 (1959).

tube and so moves the stylus arm. The position of the stylus is recorded on the chart by the automatic action of the recorder to give a permanent record of river level.

6. At most stream gauging sites it is necessary to obtain rainfall records. These can be provided by a second pen recording on the same chart. Rain is metered by an 8 in. diameter transmitting raingauge mounted in a suitable position adjacent to the recorder and connected to it by twin electric cable. This gauge transmits an electrical impulse for every one hundredth of an inch of rain falling in the collecting funnel, to energise a relay mounted in the recorder which in turn actuates the recording stylus. The stylus passes fully across the chart for 200 impulses or 2 inches of rainfall. It then returns to the zero position to continue recording subsequent rainfall, wo that the record appears as a series of sloping lines, the angle varying with rainfall rate. Total rainfall is assessed by counting the number of passes of the pen across the chart multiplied by 2 to give inches of rainfall.

7. The recorder has been subjected to extensive field trials in a variety of climates and it is now being commercially manufactured in Melbourne. So far 80 instruments have been supplied to various authorities in a number of countries. They have proved easy to install and maintain and have given trouble-free operation over the past three years.

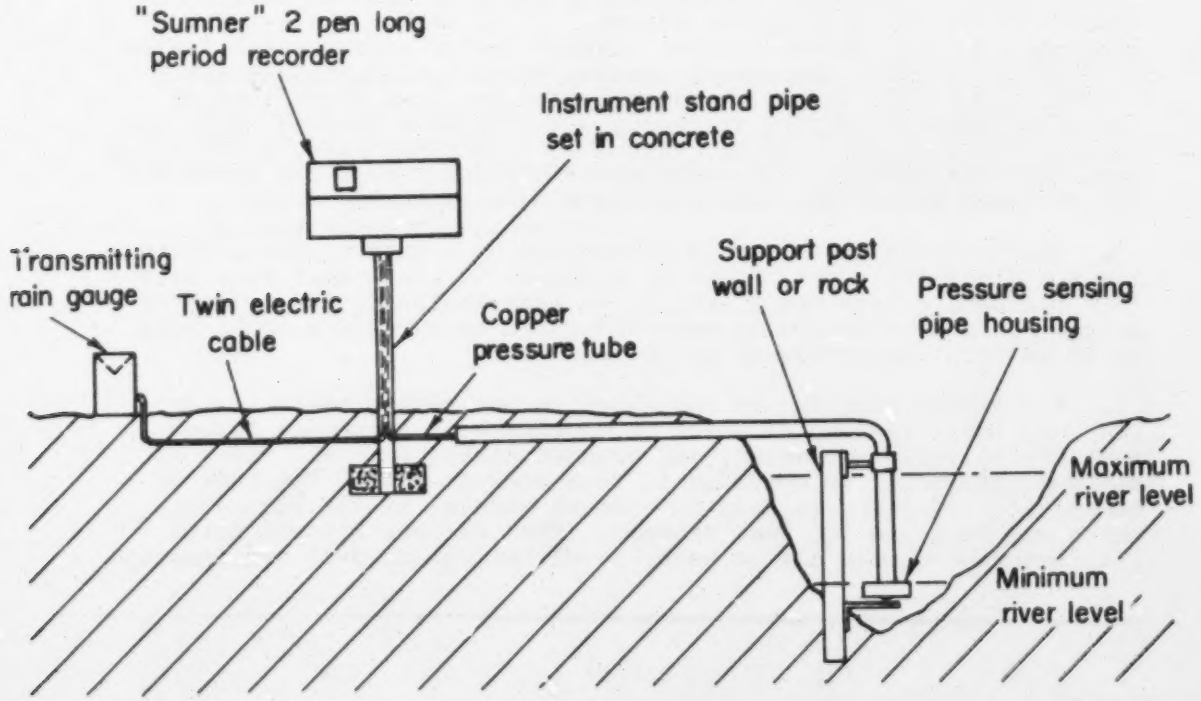
"Sumner" 2 pen long period recorder
Instrument stand pipe set in concrete
Transmitting rain gauge
Twin electric cable
Copper pressure tube
Support post wall or rock
Pressure sensing pipe housing
Maximum river level
Minimum river level

Figure I. Pneumatic water level and rainfall recording installation.

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